

## Spectrum Illumination Lighting Selection Chart

Select a lighting technique that creates the highest possible contrast between the feature of interest and its surroundings or background.

Part Feature <sup>1)</sup>	Backlight	Diffused Axial	Ring & Bar	Dome with Diffused Axial	Dark Field Ring	Examples
<b>Absorption</b> <sup>4)</sup> Look for change in light absorption, transmission or reflection	None	Uniformity of technique ensures absorption changes on flat surfaces are observable	Application dependent	Uniformity of technique ensures absorption changes on bumpy surfaces are observable	Minimal effect	<ul style="list-style-type: none"> <li>Fuses in block</li> <li>Ink printed matter</li> <li>Plastic caps</li> <li>UV emission</li> <li>IR through plastic</li> </ul>
<b>Texture</b> <sup>3)</sup> Look for change in surface texture or finish	None	Textured surfaces DARKER than polished	Application dependent	Minimizes texture	Textured surfaces BRIGHTER than polished	<ul style="list-style-type: none"> <li>Polished surface</li> <li>Laser annealed</li> <li>Sandpaper grit</li> <li>Scratched surface</li> <li>Material change</li> </ul>
<b>Elevation</b> Look for change in height from surface to camera	None	Angled surfaces are darker	Application dependent	Minimizes shadows	Outer edges are bright	<ul style="list-style-type: none"> <li>Notched part</li> <li>Dotpeen mark</li> <li>Embossing</li> <li>Engraving</li> <li>Angled/beveled</li> <li>Foreign debris</li> </ul>
<b>Shape</b> Look for change in shape along the x/y axis (contour)	Shows outside contours	Changes evident if background is different	None	None	Contour highlighted, flat surfaces darker than raised	<ul style="list-style-type: none"> <li>Parts on conveyor</li> <li>Coins</li> <li>Edge dimensions</li> <li>Short shot</li> <li>Injection molding</li> </ul>
<b>Translucency</b> Look for change in density-related light transmission	Shows changes in translucency vs. opaquesness	Minimizes clear FLAT overcoats (e.g. glass, varnishes) if background is different and shows changes in translucency vs. opaquesness if background is different	Application dependent	Minimizes clear BUMPY overcoats (e.g. plastic overwrap, curved glass) and shows changes in translucency vs. opaquesness if background is different	None	<ul style="list-style-type: none"> <li>Drilled hole</li> <li>Thin area in plastic</li> <li>Plastic lens ID number</li> <li>Multi-layer material</li> <li>Debris in liquid</li> <li>LCD inspection</li> </ul>

1) Surface absorption is effected by the color (spectrum) of illumination. Surface texture, elevation, shape and translucency are effected by the direction of illumination.

2) Uniformity of lighting increased from Domes to Domes with Diffused Axial.

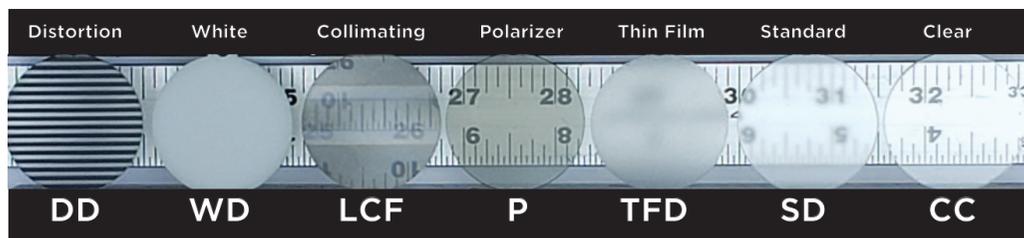
3) Texture is both the presence of texture (matte, diffused, bumpy, rough) and its absence (shiny, specular, reflective, polished, smooth, glossy).

4) Using the opposite light spectrum will make a part feature appear darker. Using the same light spectrum will make a part feature appear lighter.

Examples:

- If the part feature you want to make darker is red, use a green light.
- Use a green light to make a green feature appear lighter.

## 7 diffuser options



MACHINE VISION LIGHTING SINCE 1999

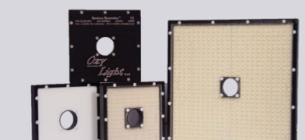
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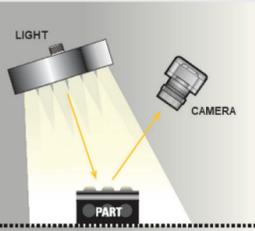
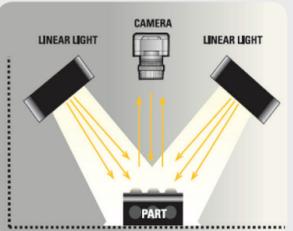
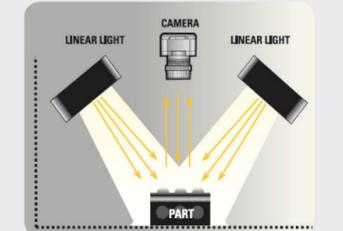
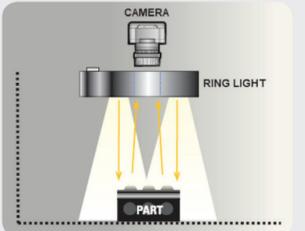
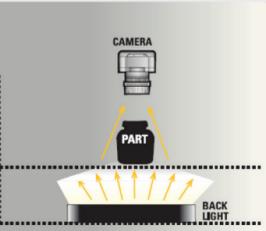
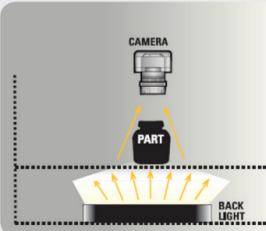
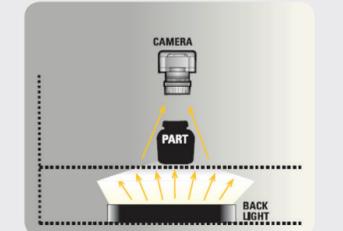
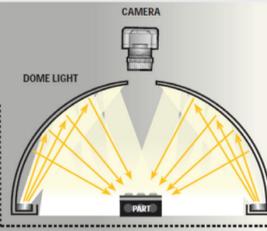
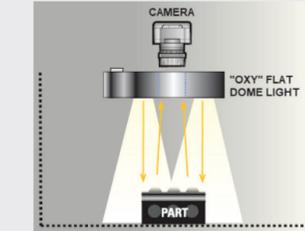


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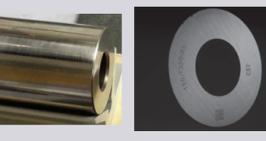
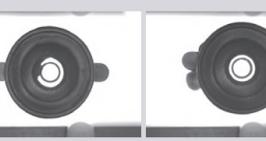
## PRODUCT APPLICATIONS



Spot Lights	E & X Linear (Bar) Lights	Monster Linear (Bar) Lights	Ring Lights	Standard Back Lights	Monster Back Lights	Conveyor Back Lights	Dome Lights (Cloudy Day)	Flat Dome (Oxy) Lights	Wash down Lights
 <p>Spot Lights are typically characterized as general purpose lighting. They may be used to create both bright field and dark field effects, depending on the light angle of incidence. Working distances can be short to long, depending on available intensity and beam spread. Small spot lights are beneficial when deployed in tight spaces.</p>	 <p>Bar lights use LED arrays in compact, linear units to provide economical illumination for a variety of tasks. Available in several lengths, bar lights are useful for large area illumination when used in opposing pairs or in a picture frame mounting orientation. Bar lights can also be used in place of spot or ring lights when greater intensity is required.</p>	 <p>Bar lights, also known as linear array lights, offer both bright field and dark field illumination, depending on the angle of incidence with respect to the object of interest.</p>	 <p>Bright field ring lights provide illumination directly onto an object, at angles of incidence above 45 degrees from horizontal, creating distinct shadows or general purpose illumination depending on subject features. This type of lighting is effective when used on objects requiring high degrees of contrast, but may create unwanted specular reflections when directed at shiny or reflective materials because of the high angle of incidence. Working distances can be short to very long.</p>	 <p>Back lighting provides an area of uniform illumination, oriented behind the object of interest, primarily for creating a part silhouette of instant contrast between dark and light. It is most useful for edge detection, part location &amp; orientation or presence &amp; absence, hole detection and object gauging.</p>	 <p>Monster back lighting provides an area of uniform illumination, oriented behind the object of interest, primarily for creating a part silhouette of instant contrast between dark and light. It is most useful for edge detection, part location &amp; orientation or presence &amp; absence, hole detection and object gauging. Monster back lights are up to 5 times brighter than standard back lights.</p>	 <p>Conveyor series back lights are used in a wide variety of machine vision applications to provide contrast for part inspection or robot orientation. The contrast from the back light allows for better resolution from the vision system light than reflective lighting can provide. This series is direct fit and approved for QC Conveyors, but will work in nearly any conveyor system. Additional and custom sizes are available upon request.</p>	 <p>Dome lights also referred to as "cloudy-day illumination" provide uniform illumination with no reflections or shadows. They are ideal for highly reflective objects or if your application requires even lighting over the area of inspection.</p>	 <p>Flat diffuse lights are often referred to as "Flat Domes" because of the similar performance characteristics they share with classic dome lights. If sufficiently oversized compared with the object of interest, flat diffuse lights can provide an adequate "cloudy day" lighting effect at a larger working distance than the traditional dome.</p>	 <p>Our wash down lights are waterproof, IP68 rated, and FDA compliant with a 316 stainless steel housing designed for most wet and harsh environments. Each light is individually water tested before leaving our facility.</p>

Functionality									
									

Highlights & Applications									
<ul style="list-style-type: none"> <li>Patented internal driver with intensity control on E &amp; X Series</li> <li>24 VDC External DIN driver included on Monster Series</li> <li>High Speed Strobe &amp; Constant</li> <li>High Power LEDs</li> <li>4 colors, UV &amp; IR</li> <li>4 sizes</li> <li>Removable diffuser</li> <li>Machine Integration</li> <li>Food &amp; Beverage</li> <li>Measure translucency Pharmaceutical</li> </ul>	<ul style="list-style-type: none"> <li>Patented internal driver with intensity control</li> <li>Strobe &amp; Constant with Auto Burst Technology</li> <li>Direct connect 24 VDC</li> <li>Slim line aluminum thermo housing</li> <li>Thermal protection</li> <li>Vibration resistant integrated circuit board</li> <li>4 colors, UV &amp; IR</li> <li>3 sizes plus 40mm spot light</li> <li>Removable diffuser</li> <li>Pharmaceutical</li> <li>Weights less than 1 lb for Robot applications</li> <li>10 Year Warranty</li> </ul>	<ul style="list-style-type: none"> <li>24 VDC External DIN rail mount driver included</li> <li>Patented internal driver with intensity control optional</li> <li>High Speed Strobe &amp; Constant</li> <li>High Power LEDs</li> <li>4 colors, UV &amp; IR</li> <li>20 sizes (2" to 103.5")</li> <li>Removable diffuser</li> <li>Food &amp; Beverage</li> <li>Measure translucency</li> <li>Pharmaceutical</li> <li>High speed bottling &amp; packaging operations</li> <li>10 Year Warranty</li> </ul>	<p>Standard Series: "Bright Field"</p> <ul style="list-style-type: none"> <li>Direct connect 24 VDC</li> <li>Strobe &amp; Constant with Auto Burst Technology</li> <li>Patented internal driver with intensity control</li> <li>4 colors, UV &amp; IR</li> <li>4 sizes (4" to 8")</li> </ul> <p>Monster Series: "Bright Field"</p> <ul style="list-style-type: none"> <li>24 VDC External DIN rail mount driver included</li> <li>High Speed Strobe &amp; Constant</li> <li>Removable diffuser</li> <li>4 colors, UV &amp; IR</li> <li>7 Sizes (2.5" to 30.5")</li> </ul> <p>10 Year Warranty</p>	<ul style="list-style-type: none"> <li>Low profile (≈0.85")</li> <li>Direct connect 24 VDC</li> <li>High Speed Strobe &amp; Constant</li> <li>4 colors &amp; IR</li> <li>25 sizes (1" to 12")</li> <li>Removable diffuser</li> <li>Machine Integration</li> <li>Locating mounting holes</li> <li>Locating defects on surfaces</li> <li>Automotive &amp; aerospace</li> <li>Inspections</li> <li>10 Year Warranty</li> </ul>	<ul style="list-style-type: none"> <li>Medium profile (≈1.0")</li> <li>Up to 5 times brighter than standard series</li> <li>High Speed Strobe &amp; Constant</li> <li>24 VDC External DIN rail mount driver included</li> <li>4 colors &amp; IR</li> <li>12 sizes (2" to 103.5")</li> <li>Removable diffuser</li> <li>Machine Integration</li> <li>Locating mounting holes &amp; defects</li> <li>Automotive &amp; aerospace</li> <li>Inspections</li> <li>10 Year Warranty</li> </ul>	<ul style="list-style-type: none"> <li>Lower Profile (≈0.75")</li> <li>No surface screws</li> <li>Direct connect 24 VDC</li> <li>High Speed Strobe &amp; Constant</li> <li>4 colors &amp; IR</li> <li>25 sizes (1" to 12")</li> <li>Custom Conveyor</li> <li>Machine automation</li> <li>Machine integration</li> <li>10 Year Warranty</li> </ul>	<ul style="list-style-type: none"> <li>Strobe &amp; Constant</li> <li>Patented internal driver with intensity control (2 sizes)</li> <li>24 VDC External DIN rail mount driver included (6 sizes)</li> <li>4 colors, UV &amp; IR</li> <li>2 sizes 85mm and 180mm (Internal Driver)</li> <li>6 sizes 85mm to 743mm (External Driver)</li> <li>Multi zone/color options (85mm and 180mm)</li> <li>Diffused Axial available to eliminate the appearance of the camera hole</li> <li>10 Year Warranty</li> </ul>	<ul style="list-style-type: none"> <li>Direct connect 24 VDC</li> <li>2 colors &amp; IR</li> <li>2 sizes (6" &amp; 12")</li> <li>Removable diffuser</li> <li>10 Year Warranty</li> </ul>	<p>Standard Series Wash Down Lights:</p> <ul style="list-style-type: none"> <li>Direct connect 24 VDC</li> <li>Strobe &amp; Constant</li> <li>4 colors &amp; IR</li> <li>Back Lights (4 sizes) and Ring Light (1 size)</li> </ul> <p>Monster Series Wash Down Lights:</p> <ul style="list-style-type: none"> <li>24 VDC External DIN rail mount driver included</li> <li>High Speed Strobe &amp; Constant</li> <li>High power LEDs</li> <li>4 colors, UV &amp; IR</li> <li>Linear Lights (4 sizes), Spot Lights (2 sizes), Ring Light (1 size), Dome Light (1 size)</li> </ul> <p>3 Year Warranty</p>

Application Examples									
 <p>Object: Optical Inspection of PCB board Machine reads the component's datamatrix serial number and checks the part's body for surface defects.</p>	 <p>Object: Dental Implant Inspection Inspects for defects in implants. UV light illuminates implant defects.</p>	 <p>Object: Packaging Inspection Image captured shows high contrast package parts. Checking for presence or absence and orientation.</p>	 <p>Object: Bolt Coating Inspection Bolts with resin applied for thread lock. UV light illuminated the resin coating.</p>	 <p>Object: Steel Bearing Backlighting allows high contrast image of bearing or surface.</p>	 <p>Object: Injection Molded Part Back light allows high contrast image of center hole for presence or absence.</p>	 <p>Object: Robotic Work Cell Robot picks and places items from back light conveyor. Back light illumination allows high contrast image of parts.</p>	 <p>Object: Embossed Logo on Metallic Surface Dome light removes the glare and provides a high contrast image.</p>	 <p>Object: Embossed/Stamped Logo/Characters on Painted Parts High contrast image allows inspection or reading.</p>	 <p>Object: Plastic Food Packaging Wash down dome light allows a clear image showing</p>

lens options



12 Degree



16 Degree (Frosted)



23 Degree (Frosted)



30 Degree



39 Degree (Frosted)



50 Degree



90 Degree (Reflector)



60 Degree (Reflector)



Line

